

14. A method as set forth in claim 1 characterized in that the approximation straight line passes over a plurality of steps of the rastered edge configuration and that the approximation straight line ends when one of the criteria

- 1) there can occur a maximum of two different step lengths, the step lengths of which may also differ by a maximum of 1,
 - 2) only one of the two step lengths may occur a plurality of times in succession,
 - 3) the sequential arrangement of the numbers of the steps which are of the same length gives a number sequence in which there is alternately always a one and then any number (>0). The ones (only those at each second position) are deleted from that sequence. In the sequence obtained only two different numbers which differ by one may again occur,
 - 4) in the sequence obtained in 3, only one of the two possible numbers may occur a plurality of times in succession,
- or one of the criteria 1), 2), 3) or one of the criteria 1), 2) is not fulfilled.

15. A method as set forth in claim 1 characterized by the provision of a triple buffer, wherein the three resulting buffers share in cyclic interchange in parallel relationship the method steps of rendering post-anti-aliasing and image reproduction.

REMARKS

In the Office Action dated May 13, 2002, claims 1 - 12 and 16 - 18 were rejected under 35 U.S.C. § 102. Claims 13 - 15 were deemed allowable if rewritten in independent form. By this Amendment, applicant has amended claim 1 to correct a typographical error. In

addition, applicant has canceled claims 16 - 18. Accordingly, claims 1 - 15 are now pending in this application.

Applicant traverses the rejection of claims 1 - 12 under 35 U.S.C. § 102. The cited references, considered either separately or in combination, do not teach or suggest the "application of an edge operator to an image portion for coarsely ascertaining at least one rastered edge configuration" as claimed in the sole independent claim, claim 1. Thus, claims 1 - 12 are not anticipated, nor can they be obvious over the cited art.

Response to the Rejection of Claims 1 - 12 Under 35 U.S.C. § 102

Claims 1 - 12 stand rejected under 35 U.S.C. 102(b) as being anticipated by Shiraishi (5,903,276). Regarding the sole remaining independent claim, the Office Action states at paragraph 6:

As per claim 1, Shiraishi discloses a method of eliminating unwanted steps at edges in image representations in the line raster, in particular in on-line operation, characterized by the steps:

a) application of an edge operator to an image portion for coarsely ascertaining at least one rastered edge configuration (Figure 1 3 Drawing Processing Unit),

b) determining the position of at least a first pixel from the amount of those pixels which form the rastered edge configuration or adjoin said rastered edge configuration (Figure 4, "Each edge of the polygons defined by these apexes has a X-start point ... a Y-start point ...", column 7, line 13-23,

c) approximation of a straight line for ascertaining a probable configuration of the unrastered image edge in the proximity of the first pixel (Figure 5 is an illustrative drawing directions of the vector, column 7, line 26-27),

d) ascertaining a criterion from the approximation straight line and the position of the first pixel for mixing a color X to the Color C in the first pixel considered (Figure 38 establishes the criterion to mixing the color, column 20, line 62-column 22, line 24), and

e) mixing the ascertained color X to the color C in the first pixel considered (Figure 49, where a dot is considered a pixel, column 49, line 10-14).

Applicant respectfully disagrees with the assertion that Shiraishi discloses the claimed invention. For example, clause a) of claim 1 recites: "application of an edge operator to an image portion for coarsely ascertaining at least one rastered edge configuration." Thus, the method of the claimed invention uses information of image data which are already rendered. This is referred to as post-antialiasing.

In contrast, the method described by Shiraishi is not applicable for graphic representations in the line raster. The Drawing Processing Unit in Figure 3 of Shiraishi cited in the Office action incorporates a Polygon Extracting Unit 32. The Drawing Processing Unit does not include any structure for operating on a "rastered edge configuration." The method described by Shiraishi can be summarized as follows:

- a) creating and storing polygon image data (column 6, lines 25 to 41),
- b) extracting coordinates of the end points of the edges of the polygons (column 7, lines 13 to 23),
- c) determining the orientation of the edges (left, right) (column 7, lines 25 to 32),
- d) calculating the edge slopes (column 8, line 30 to column 9, line 2) with the aid of the coordinates of the end-points of the edges,

e) interpolating and storing the edge coordinates X, Y, Z (column 9, lines 20 to 30),

f) calculating for every pixel the portion of the polygons in the pixel area (column 6, lines 44 to 47, column 10, lines 50 to 55). This comprises first quantizing and coding of the edge slope (column 11, lines 4 to 14), and determining and coding the crossing points of the edges with the sides of the pixels (column 11, line 31f),

g) determining the color of a pixel with the aid of the portion of the pixel areas on both sides of the edge.

Thus, the method of Shiraishi is based on a polygon representation, not a rastered edge configuration.

Accordingly, Applicant submits that independent claim 1 and claims 2 - 12 that depend on claim 1 are not anticipated by nor obvious in view of Shiraishi.

Conclusion


For the foregoing reasons, Applicant submits that claim 1 - 15 are allowable over the cited references. Accordingly, Applicant respectfully requests allowance of the claimed invention.

Attached hereto is a marked-up version of the changes made to the above-identified application by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Twice Amended) A method of eliminating unwanted steps at edges in image representations in the line raster, in particular in on-line operation, characterized by the steps:

a) application of an edge operator to an image portion for coarsely ascertaining at least one rastered edge configuration,

b) determining the position of at least a first pixel from the amount of those pixels which form the rastered edge configuration or adjoin said rastered edge configuration,

c) approximation of a straight line for ascertaining a [~~probably~~] probable configuration of the unrastered image edge in the proximity of the first pixel,

d) ascertaining a criterion from the approximation straight line and the position of the first pixel for mixing a color X to the color C in the first pixel considered, and

e) mixing the ascertained color X to the color C in the first pixel considered.